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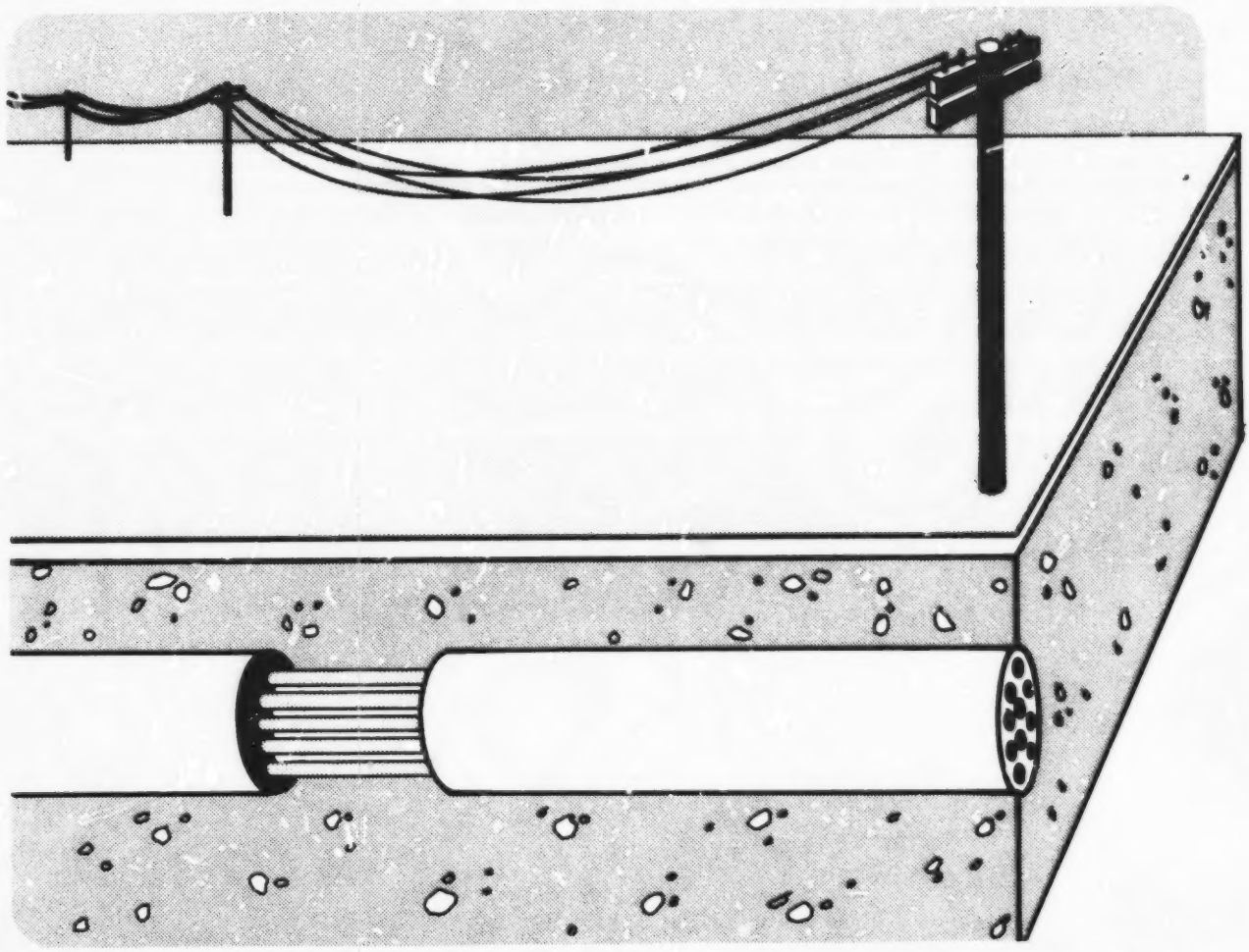
Maintenance Manual

Primary and Secondary Power Feed Lines



COMPLETED

MAINTENANCE MANUAL

PRIMARY AND SECONDARY POWER FEED LINES

Federal Emergency
Management Agency

Maintenance Manual
Primary and Secondary Power Feed Lines

Introduction

The purpose of this manual is to guide you on how to maintain primary and secondary power feed lines. The information in this manual is only a **supplement** to the recommended maintenance information furnished by the local utility. **Always follow the maintenance procedures provided by the local utility for its electric lines.** This manual will help you understand why maintenance is necessary. This manual will also be helpful if the manufacturer's maintenance manual is not immediately available.

Description of Primary & Secondary Power Feed Lines

Primary and secondary power feed lines are the means by which an utility distributes electricity from a power station to the ultimate consumer. **These conduits of electricity are high voltage lines carrying up to 20,000 volts for large industrial users.** We are more familar with the 240 volt lines, bringing electricity to smaller buildings such as our homes. **This manual will deal only with power feed lines in the 240 to 1200 volt range. It should not be used for power feed lines carrying more than 1200 volts. If there is any question, contact your local utility first.**

There are two types of power feed lines.

1) Underground.

There are two types of underground systems:

a) direct burial systems, where the cables are buried directly in the earth, and

b) conduits, where the cables are installed in a concrete tunnel.

Directly buried power feed lines are constructed so that the system is well grounded and the individual lines are evenly spaced. Underground raceway systems can be identified by the manholes, on streets and sidewalks, which intercept concrete conduits containing the power lines. The size and number of these conduits depends on the number of lines the system carries; the voltage within a conduit will vary.

2) Overhead.

Overhead power lines consist of the familar poles, supporting cables of various sizes and lengths. These lines make use of open wire construction. The basic features of open wire

construction are single lines, insulated supports, and widely separated conductors. In some places, open wire is not desirable because the lines are closely spaced. In these cases, insulated cable is used. These lines can be identified by the messenger wire, which supports the lines attached to it by rings or other devices.

Preventive Maintenance

To ensure that the power feed lines work in an emergency, you should **regularly check the lines to spot small troubles before they become big problems. A coordinated maintenance plan, developed with the local utility, is the best way to ensure the flow of electricity during an emergency.** Semiannual, annual, and biennial maintenance checks prevent serious problems from suddenly happening.

Develop a routine of visually inspecting overhead power lines. Watch for frayed connections and loose wires. These checks can be integrated into other routines made in the vicinity of power lines and can help avoid more serious problems.

Equipment and Spare Parts

Only ordinary mechanical and electrical tools are necessary to perform most simple maintenance on primary and secondary power feed lines. **Consult with your local utility before attempting any live-line maintenance. Special tools are necessary for this sort of work. These tools require the user to have special training.** Work with the utility's experienced personnel before attempting any live-line maintenance.

Power feed lines require few spare parts. **Coordinate your efforts with the local utility, jointly developing a list of parts on hand.** An example of such a list is given in the following table.

Spare parts for overhead power feed lines

Name of part	Quantity on hand
No. 4 AWG service entrance	100 ft.
part type insulators	10
wire ties	10 ft.
clamp splices	5
lead sheathing	50 ft.

Safety

Primary and secondary power feed lines are extremely dangerous. Only experienced and trained technicians should attempt to repair any problems on these lines. **Follow safety precautions outlined by your local utility. Contact your utility as soon as you suspect a problem.** The procedures outlined in this manual should be part of a coordinated program with your local utility.

6-Month Maintenance Checks for Underground lines

1) Inspect manholes and determine if they are watertight. Repair as necessary.

12-Month Maintenance Checks for Underground lines

1) Grout chipped concrete at manhole entrance.

2) Remove debris from manholes that could cut feeder lines.

24-Month Maintenance Checks for Underground lines

1) Test insulation resistance of cable.

2) Test cable for current carry capacity, using overvoltage test.

3) Survey power requirements for facility. Determine if power feed lines are large enough to meet 120 percent of the needs of the facility.

12-Month Maintenance Checks for Overhead lines

1) Inspect wooden poles for signs of rot or decay. Treat or replace as necessary.

2) Examine power feed lines for abrasion, burns, poor connections, and excessive vibration. Repair or replace as necessary.

3) Examine insulators for cracks or chips. Replace as necessary.

4) Remove tree limbs and branches that overhang power lines.

5) Clean insulators on poles to remove dust and grease that can reduce the insulator's efficiency.

6) Examine grounding.

24-Month Maintenance Checks for Overhead Lines

1) Measure maximum drop of line between poles to determine if it follows specifications. Repair or replace as necessary.

2) Survey power requirements for facility. Determine if power feed lines are large enough to meet 120% of the needs of the facility.

Corrective Maintenance: Troubleshooting

Some equipment malfunctions may be discovered during routine maintenance checks. During normal operations, you may also discover that you are not receiving enough electricity to operate needed equipment. This "brownout" may indicate problems with the power feed lines. You should perform the tests on the following table to locate the problem and correct it with the assistance of experienced personnel.

PLEASE NOTE: This manual does not attempt to list all possible malfunctions that could occur nor can we suggest all possible remedies. Consult with your local utility if a malfunction is not listed or it is not corrected by prescribed procedure.

Corrective Maintenance: Power Feed Lines

Malfunction	Possible Cause	Recommendation
1. No current to building.	■ broken cable.	■ reattach cable.
	■ burned-out transformer.	■ repair or replace transformer.
2. Reduced voltage.	■ damaged cable.	■ repair or replace cable.
	■ moisture in cable insulation.	■ find source of water and repair. replace cable.
	■ cracked insulators.	■ replace insulators.

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